

likewise metallic oxides; and that in this case, the whole class of earths and stones will disappear from the mineral kingdom."

We have not spoken of the peculiar adaptation of this work to students of medicine, since it contains about as much as other general treatises, if not more, that is directly interesting to them; in this point there might we apprehend be considerable improvements in works intended specially for the student of medicine.

B.

XXII. *Intorno alla Natura del Miasma Choleroso Asiatico congetture di B. M. Trasmesse alla Società Medico-Chirurgica di Berlino. Lucca, 1832.*  
*Conjecture relative to the Nature of the Miasma productive of Asiatic Cholera.* By B. M. &c.

The author of the little work whose title is prefixed to this article, Professor Mojon, of Genoa, occupies very deservedly a conspicuous station among the members of the medical profession in Italy, both as a profound and erudite pathologist and physiologist, and as a skilful physician. His reputation is not limited to his native country, but has extended abroad, where he is known as the author of many valuable publications, some of the principal of which have been translated into various languages, and widely circulated in France, Germany, and England. Occupying, during the dominion of Italy by the French, a professorial chair in the medical department of the University of Genoa, which chair, it may be proper to remark, he gained by concours among twenty-four competitors, he shared, soon after the transfer of Genoa to the Sardinian government, the fate of many of his most distinguished colleagues, and was dismissed on account of his political sentiments, from the school of which he was considered one of the brightest ornaments. But this event, far from lowering him in the estimation of his countrymen, the majority of whom are, as may be presumed, hostile to the present order of things, or abating his zeal for scientific pursuits, tended to render him perhaps more popular than he was before, and, as we may judge from the various physiological and practical works, with which he has enriched the medical literature of his country, to stimulate him to further efforts.

The last, and not the least interesting of those publications, is, we believe, the one at present before us. This essay was written, as we are informed, with a view to its being published at Genoa. Meeting, however, with opposition on the part of government, and not feeling disposed to modify his views, or expunge passages which were thought obnoxious, the author changed his plan, and addressed his manuscript to the Medico-Chirurgical Society of Berlin. A short time after, a copy of the work found its way to Lucca, and was there printed and published, without, however, as we learn from the editor himself, the sanction of the author.

This unwillingness on the part of the government of Genoa to allow the publication of an essay on a purely scientific subject, would, perhaps, have been calculated to surprise us, were we not fully aware of the difficulties which authors encounter in countries deprived of the liberty of the press, and of the ridiculous height to which opposition to the manifestation of independence of sentiment is carried in the territories of his Sardinian majesty. A very careful

examination of the present work has not enabled us to discover in it any thing calculated to prove offensive or dangerous to government, unless the decided opposition of the judicious and learned author to the doctrine of contagion, and to the measures based upon that doctrine—sanitary cordons, isolation, quarantines, &c. be regarded in that light. On these points the Sardinian, like many other governments in Europe, appears to be very resolute, and determined, by making use of its power over the press, to prevent the expression of views different from those which it has thought expedient, from various motives, to adopt. Happy would it be if the change of sentiment, relative to the mode of propagation of the disease, and to the sanitary measures necessary to be employed, which has taken place in the north of Europe, could be looked for on the other side of the Alps. Ignorant themselves of truth on the point in question, and imposing silence on those capable to enlighten them, the Italian governments and the Sardinian, the most despotic and ignorant of all, more particularly, are not likely to grant any modifications in their sanitary codes, and the disease, should it ever break out in Italy, may, in consequence, be expected to occasion the greatest havoc. If the offence of Dr. Mojon consists, as we suspect it does, in having expressed sentiments favourable to the opinion of the non-contagion of the cholera, he will no doubt find sympathy in France, in this country, and in England, where the doctrine he upholds is almost universally adopted,—where the liberty of the press is enjoyed by all classes of society,—where the fullest scope is allowed to the exercise of the intellectual faculties, and where scientific subjects are discussed without any reference to the partiality or dislike of government.

But to return from this digression. Dr. Mojon's essay has been translated into the French and German languages, and may thereby, independently of the claims it possesses to our attention from the high reputation of the author, be presumed to be worthy a notice in this Journal. Dr. Mojon may also, for another reason, be regarded as entitled to a hearing on the subject of cholera. He must not be classed among those numerous physicians of Italy and elsewhere, who have studied the etiology, pathology, and treatment of cholera in books, and presume to enlighten the rest of their professional brethren on those various points. So far from resting satisfied with information derived in this easy way, he left Genoa and repaired to Paris as soon as he learnt that the cholera had made its appearance there, and enjoyed the fullest opportunity to investigate the causes and nature of the disease in the numerous and crowded hospitals of that metropolis. Notwithstanding these various recommendations, however, we doubt whether he will make many proselytes in this or any other country, inasmuch as his object is to advocate a doctrine which has heretofore enjoyed but little popularity among the members of the medical profession—that the efficient cause of cholera consists in animalcules floating in the atmosphere, and which, penetrating into the system through all the pores, situated on the internal and external surfaces, give rise to the symptoms of the disease. In upholding this doctrine, Dr. Mojon has not the pretension to claim credit for originality, aware as he is, that a similar view of the cause of cholera has already been advocated by several modern physicians, by Hahnemann, Lamotte, Neale, &c. His object is simply to add to the facts and arguments adduced by them, others which, in his opinion, are calculated to give additional weight to

the theory they defend; and we have no hesitation in saying, that, so far as we are able to judge, he has executed his task in a learned and ingenious manner.

In saying thus much, however, we do not wish to be understood as admitting, that Dr. Mojon has succeeded in making a convert of us. For although he may deserve the credit we have bestowed upon him, although he may have shown that the animalecular doctrine is as likely as not to be correct;—that it is entitled to at least as much respect as any other doctrine with which we are acquainted; we do not think that either he or any one else has as yet demonstrated its truth in a conclusive manner. In order that this should be effected it would be absolutely necessary to produce those insects; to render them appreciable to the senses. We fully agree with Dr. Mojon, that it is not proper to deny the existence of a thing on the mere ground that it has not been seen, and that we are not as yet conversant with all its characteristic properties. But at the same time we are decidedly of opinion, that in a question like the present, few individuals will feel disposed to admit the necessary agency of those insects from the mere circumstance, that by so doing they will be better able, than by any other theory, to explain the various phenomena presented by the malady. The facility which the hypothesis affords, entitles it, no doubt, to attention and respect. But it will not be deemed sufficient. Some positive proof of the existence of the animalecules is required, and should none be offered it will always be in the power of individuals to deny their agency, and to maintain that we have no evidence of the possibility of an epidemic of so wide spreading a character—the cases of which are characterized by so frightful and appalling a train of symptoms, arising from the ingestion of insects of so diminutive a size that their existence can only be inferred through the aid of analogy.

We are aware that Varro, Lucretius, Colummella, Vitruvius, Kireher, Le Gendre, considered the plague as arising from animalecules—that Langius, Lancisi, Fabre, Linnæus, Paul Ricca, Moufflet, Seuderer, Crawford, applied the same doctrine to the explanation of the same disease, and of miasmatic fevers generally; that Hautmann, Plenitz, Desault, Rasori, Puccinotti, Targioni, Acerbi, &c. regarded contagious diseases as arising from the action of living organized creatures. But it may still be maintained, that this great array of names avails but little in support of the animalecular doctrine, because, distinguished as most of those individuals may be, they have after all done little else than lend their aid to the support of an hypothesis, and adduced no facts capable of proving satisfactorily the existence of the cause for which they contended.

Without admitting or rejecting therefore, the theory which Dr. Mojon has undertaken to defend, we proceed to state in as concise a manner as possible some of the facts and arguments he has collected in its favour.

1st. There are certain diseases incident to sheep, oxen and horses, of which the cause was formerly unknown, but which subsequent experience has shown to depend on the action of various kinds of insects that find their way into, and live and multiply in the viscera of those animals. Baron describes an epizootic disease which prevailed among the Gallinæ of Lombardy, in 1783, and which was finally discovered to depend on a similar cause. Many instances are on record of forest and other trees being destroyed in great and even extraordinary numbers, in various parts of Germany, England, &c. After giving rise to much contro-

versy, the cause of this mortality was finally ascertained to arise from other varieties of insects.

2d. The author describes the localities of that part of India where the disease is supposed to have originated; its soil, marshes, climate, &c. and thinks, that from the peculiar nature of the country, as well as from the great number of dead bodies allowed to putrify on the banks of the Ganges, there may be presumed to originate swarms of insects capable of acting as the exciting cause of the cholera, which he regards as an endemic of that country.

"If, as he remarks, we consider 1st, that in 1817, during two consecutive seasons, there reigned along the coast of the gulph of Bengal a very extraordinary atmospherical constitution, and that the weather, instead of being very warm and clear, was, at the commencement, cold and hazy; 2d, that there fell a great quantity of rain, at a period when there usually prevails considerable dryness; and, that from this circumstance there resulted inundations such as had not been observed for a long time before, along the Delta of the Ganges; 3d, that the rainy season was very warm, and the nights cold and windy; 4th, and lastly, that the crop of rice and of vegetables generally was, in that year, very small; if we have regard to all these circumstances, I say, it will no longer appear extraordinary that the miasma of the disease, which had heretofore been only endemic in those localities, should by these effects have acquired an unprecedented degree of development, and passed into other countries, where meeting with a combination of circumstances suitable to its development, it increased in force, and thence propagated itself as far as ourselves. No one is ignorant of the fact, that after heavy rains, thunderstorms and inundations, swarms of insects emigrate to immense distances; and that encountering circumstances favourable to their multiplication, they remain there for some time, and thence proceed to other places, causing in the inhabitants diseases of a peculiar character."

3d. The peculiarity manifested by the disease, of breaking out and raging extensively in climates of the most opposite character, and under the most diversified degrees of temperature, may be adduced in favour of the animalcular doctrine. We are not acquainted with any general cause of disease capable of prevailing under those very various circumstances, except the one in question; because insects are known to accommodate themselves to every climate, and to every temperature. But although the cholera has appeared in countries differing greatly in respect to climate; yet it is not less the fact, that it has generally been found to increase in summer and decrease in winter. In other words, it is influenced in its progress by those circumstances which tend to favour the multiplication of insects. It is also modified by changes of temperature which take place in any place during the time of its prevalence—as for example when night rains are succeeded by intense heat during the day. Now, we all know, that insects increase or diminish in number, that the virulence of their action upon animals is modified, in the same season, according to the degree of atmospherical temperature, and that they greatly multiply and become more offensive in weather such as we have described. The peculiar property of the disease to attack distant places, and leave the intermediate spaces free, is more easily accounted for by the supposed agency of insects, than by any other cause; for they are known to stop only in places where they discover the existence of circumstances requisite for their multiplication; and as these circumstances are generally met with in large and populous towns, and especially in the habitations of the poor and needy, who are usually regardless of the precepts of

hygiene, live in the lowest, least ventilated, and most filthy situations, we find that the disease prevails there with most intensity, while other places are entirely exempted, or at least suffer in a less violent degree.

4th. It has generally been observed in those places where the cholera reigned in the epidemic form, that previous to its appearance, the atmosphere was hazy, though the sky remained cloudless, and that the sun appeared as if deprived of its usual brilliancy. The explanation of this phenomenon is probably to be derived from large swarms of insects floating in the air, and preventing the rays of the sun from producing their ordinary degree of light.

Writers and observers of great merit have viewed the large number of insects they saw in many places where the cholera has reigned epidemically, as the precursors of the disease. That such swarms of insects have been found to exist in many places—that they have continued to do so for some time to an extraordinary extent, are facts too well authenticated to be called in question; and that there may exist swarms of other insects, which though too small to be seen by means of the unassisted eye, or with aid of the instruments at present in use, are yet capable of occasioning by their action on the vital organs a variety of diseases, is not so preposterous a supposition as some might perhaps believe. There appeared two years ago, in Sardinia, a black cloud which, during a few hours, enveloped the whole island. Through the effect of that cloud the crop of wheat was completely destroyed; every grain being charred and deteriorated. By many it was supposed that this cloud or fog which was carried to the island by the south wind, was formed like those which sometimes spread over the plains of Africa, and destroy the whole vegetation by an immense mass of very minute insects. Writers talk of a yellow dust, and of fetid clouds which are observed in countries where the cholera prevails, and Herrmann is of opinion that the atmosphere of places visited by the pestilence contains a substance which is deposited on cold surfaces, and has the appearance of animal mucus. It has also been shown, that during epidemics of cholera, alimentary substances take on the putrefactive process, much sooner than under any other circumstances. Such, at least, has been affirmed to be the case by Capplez, Lamoth and Coulier.

5th. The prophylactic treatment of cholera may serve to confirm the truth of the animalecular doctrine. To live with sobriety, to guard against atmospherical vicissitudes, to keep the body clean; and to make use of strong odours, as those of camphor, cajeput oil or garlic, and to wash the hands and face with vinegar and water, or a solution of the chlorate of lime, are the means recommended. What other measures could be resorted to for the purpose of guarding against the effects of insects floating in the atmosphere, or against verminous affections generally.

6th. The symptoms of cholera bear a considerable analogy to those of the last mentioned diseases; with this difference, however, that the cold and shrivelled appearance of the surface, the blueness of the skin, and the peculiar changes in the blood, which are so generally found to occur in cholera, are not met with in the others. The absence of those symptoms probably depend on the circumstance, that in cholera the insects which give rise to the disease, penetrate along the trachea and bronchia into the lungs, and derange the pul-

monary functions to such a degree, that the process of hematosiis is not effected in a suitable manner; the oxygenation of the blood is not complete, and the animal heat remains deficient; while in verminous affections, the exciting cause being limited to the gastro-enteric system, does not produce the morbid alterations depending on the derangement of the respiratory functions. The dark colour of the blood in cholera, is not caused by the abundant secretion of sero-mucous fluid which takes place in that disease; for in other complaints, evacuations equally profuse of a similar substance, take place without being followed by a corresponding change in the blood. Morgagni states, that he lost sixteen pounds of serous fluid in the course of twelve hours; and yet his blood is not said to have undergone the alterations noticed in cholera.

7th. The treatment found most appropriate in cholera, lends support to the doctrine which ascribes this disease to the action of minute insects. Calomel, tartar emetic, opium, cajuput oil, spirit of turpentine, ether, camphor, hydrocyanic acid, ice, castor oil, are regarded as heroic anthelmintic remedies, and have all been employed with more or less success in cholera. If notwithstanding the use of these remedies, the cure is not effected, this must be attributed to some peculiarity of constitution or temperament in the individual affected, to the intensity of the attack, or to other circumstances depending on the nature of the climate, localities, &c. Hence leeches, the lancet, warm, dry and irritating frictions, blisters, sinapisms, baths, and many other external remedies do not succeed in cholera, otherwise than by remedying to the secondary symptoms of complication, which may occur during the course of an attack, and not by removing the efficient cause of the disease, which appears to be the result of an irritation, and not of inflammation.

8th. The appearances discovered on dissection may also be adduced in favour of the theory in question. In many cases, no changes from the healthy condition, sufficient to account for the symptoms, can be discovered. The redness which is sometimes noticed in the gastro-enteric mucous membrane, is the result of a preëxisting chronic inflammation, or indicates a purely congestive state of the vessels. The most constant phenomenon observed, consists of minute spots situated on the lining membrane of the alimentary tube, of the tongue, throat, &c. and imparting to the finger a sensation analogous to that produced by grains of sand. These spots were discovered by Jahn, of Berlin, who examined them with the aid of the microscope, to be vesicular, and filled with a limpid fluid. It is very probable that these minute eminences are produced by choleriferous insects, in the same way as those in which are found the *Acarus scabiei*. Professor Germac has ascertained, from microscopic injections of the vessels of the intestinal coats, that the substance employed, penetrates into the glands of Brunner and Peyer, but never into the choleric globules. By scraping off, with the back of a scalpel, the mucus adhering to the internal surface of the intestines, we discover the above-mentioned glands. They are of a pale-red colour, a circumstance which causes them to be easily distinguished from the choleric globules, as these are always of a deep red hue, analogous to that observed on skin deprived of its cuticle by means of a freshly applied blister.

9th. Dr. Martin, of Vienna, affirms, that he has observed on the skin of several choleric patients, miliary eminences analogous to those found on the intes-

tinal mucous membrane. Individuals placed under the influence of the choleric miasma, have sometimes become affected with pruritus, redness of the hands and face, and very minute vesicles of the same parts. Facts of this description were noticed at the Hospital St. Louis, of Paris, by Alibert, Duchesne, and Poisseux. At Warsaw, a cutaneous disease was observed by Hoehler, and received from him the denomination, of *Herpes zoster*, and *erithenum tuberosum*. Romberg, Hoysselden, Rayer, and Cullerier, think that the cutaneous eruption of cholera bears analogy to the measles. Alibert found that the eruption occurs sometimes at the commencement, and in other instances at the termination of the disease. The granules, he states, are round, of limited elevation, and of the size of very small millet seeds. They are highly prurigenous; are more frequently found on the chest, face, and superior extremities, and are common among females. These granules are probably produced by the same cause as those found on the internal surfaces; and if they are not as frequently observed on the skin as on the mucous membranes, the difference must be ascribed to the delicacy of structure of the latter, and the comparative toughness of the former.

10th. The sweating sickness which prevailed at the same time with cholera in several towns of France, evidently depended on the same cause as the latter. The eruption which, in cholera, generally appears on the internal surface, manifested itself in the other disease on the skin, in consequence of the irritation produced on that membrane by the insects, being rendered greater by the softened condition of the latter, occasioned by the perspiration with which the patients were affected. In cholera, the formation of the pustules, and the concentration of the sero-mucous fluids take place on the internal surface, whence arise the vomiting, diarrhoea, dry skin, &c. In the sweating sickness, on the contrary, the movement of the fluids is centrifugal, whence result the profuse perspiration and other symptoms which characterize that disease.

We have now offered an outline of Dr. Mojon's views relative to the cause of cholera, and stated briefly the facts and arguments by which he endeavours to sustain them. We ought, perhaps, next to offer his sentiments on the subject of quarantines, sanitary cordons, &c. But by so doing, we should extend this article much beyond its proper limits. Besides, we have already mentioned his opposition to the doctrine of contagion; and this taken in conjunction with his views relative to the cause of cholera, will be sufficient to indicate, that in his opinion, those precautionary measures are not entitled to any confidence.

The following remarks, however, in consequence of their having a bearing on the doctrine he upholds, may, with propriety, be introduced in this place.

"The supporters of the doctrine which refers all contagions to organic living creatures of the family of insects, or to very minute parasitic worms, will probably refuse to adopt my opinion respecting the non contagious character of the Asiatic cholera. But I wish them to remark, that my sentiment differs from theirs only in this, that cholera appears to me to arise from the action of winged monads, transmissible or transportable, by means of the atmosphere, to very great distances; while the insects which produce diseases of a strictly contagious character are not supplied with wings, and are consequently incapable of being transported except by means of solid bodies, to which they attach themselves, and through the medium of which they can transmit the contagion. Admitting this, we shall be led to regard miasmatic diseases as the effect of winged insects, and non-miasmatic maladies as the result of other insects destitute of wings. The first require, in cities, precautionary measures of an hygi-

enic character only, while the second call for quarantines, sanitary cordons on the frontiers, isolation," &c.

We need hardly remark, that the arguments adduced by Dr. Mojon are conjectural, and that though they may, to a certain extent, lend assistance to the establishment of the animalcular doctrine, they do not place it beyond the reach of doubt. Nor can we say much more of many of his facts. Some of them do not appear to be sufficiently well-authenticated to merit the confidence he bestows upon them; others are merely conjectural, or have been contradicted by subsequent experience; while others again have a very slight bearing on, or a very distant analogy with, the question under consideration. Those which relate to the prophylactic and medical treatments of cholera must be viewed as particularly objectionable; because experience has taught us to place greater reliance on the means he represents as only useful to combat secondary symptoms, and to reject most of those on which he is disposed to depend for the treatment of the disease, or for guarding against its attack. The deduction drawn from the greater disposition, in alimentary substances, to assume the putrefactive process, is of no avail, because the fact has been disproved by subsequent experiments. And as regards that drawn from the diseases of animals and trees being produced by insects, it may be remarked, that in all the instances of the kind which are on record, the presence of the latter was *proved*, by ocular demonstration, not inferred, to have been the cause of the mischief; and until an equally satisfactory proof of their existence in the atmosphere during the prevalence of cholera is offered, their agency in the production of that disease may admit of some doubt.

Notwithstanding this, however, we must once more express a favourable opinion of the industry, ingenuity, and taste displayed by the author in the collection of his materials and the preparation of the present essay—of the great learning he has manifested, and of the variety of interesting information he has embodied in a narrow compass. If ever the animalcular doctrine becomes predominant, Dr. Mojon may justly pride himself on having greatly contributed to that result. We have said, that so far as we are able to judge, the doctrine in question has not yet been proved to be entitled to the entire confidence of the profession. But while saying this, we repeat, that we are far from joining in sentiment with those who regard it as merely fanciful, and even as absurd and unworthy of notice. Unfortunately no theory heretofore proposed to account for the production and phenomena of cholera can be regarded as free from objections, and to the partisans of one doctrine, the others appear just as fanciful and ridiculous as the animalcular theory may appear to its opponents. A careful examination of those various theories will, we have no doubt, show the correctness of Dr. Mojon's opinion; an opinion which by the way has also been expressed by a distinguished physician of this country, Professor Drake of Cincinnati, that the animalcular theory will serve to explain several points in the history of the epidemic, quite as successfully as, if not better than, any of the more generally received ones. This circumstance, though it may not be sufficient to insure to the doctrine in question a preference over every other, must necessarily, and independently of the fact that it is supported by several distinguished writers, entitle it to great respect in the mind of every reasonable and unprejudiced physician.

L.